

REMARKS

In the Amendment, claim 1 has been amended to incorporate the subject matter of claim 10 and to further specify that the Friedel-Crafts reaction starting aromatic compound has at least one hydrogen atom attached directly to the aromatic group. One skilled in the art would understand that a Friedel-Crafts reaction starting aromatic compound inherently has at least one hydrogen atom attached directly to the aromatic group based on the disclosure of the present specification and the common knowledge in the art.

Claim 11 has been amended to change its dependency.

Claim 14 has been amended to improve its form. This amendment is not to be deemed to narrow the scope of the claim.

Claims 10 and 16 have been canceled.

No new matter has been added and entry of the Amendment is respectfully requested. Upon entry of the Amendment, claims 1-9 and 11-15 will be all the claims pending in the application.

I. Response to Rejection Under 35 U.S.C. § 112

Claims 1-9, 14 and 15 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Specifically, the Examiner criticizes that “aromatic compounds” as the starting material and the product are not clearly defined.

Applicants respectfully submit that the claims as amended comply with 35 U.S.C. § 112. Specifically, Applicants have amended claim 1, from which claims 2-9, 14 and 15 depend, primarily or secondarily, to recite that the Friedel-Crafts reaction starting aromatic compound has at least one hydrogen atom attached directly to the aromatic group, thereby defining it apart from “the aromatic compound by Friedel-Crafts reaction.” Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

II. Response to Rejections Under 35 U.S.C. § 102

Claim 16 is rejected under 35 U.S.C. § 102(b) as being anticipated by Burzynski et al (U.S. Pat. No. 6,372,938). In addition, claim 16 is rejected under 35 U.S.C. § 102(b) as being anticipated by Izumi et al (Bull. Chem. Soc. Jpn., 1989) (“BCSJ”).

The rejections are moot because claim 16 has been canceled.

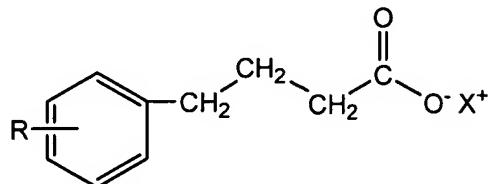
III. Response to Rejection Under 35 U.S.C. §103

Claim 1-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Burzynski et al and Izumi et al in combination.

Applicants respectfully submit that the present claims are patentable over Burzynski et al and Izumi et al in combination for at least the following reasons.

Burzynski et al discloses a method of synthesizing compounds of the following formula I by reacting aromatic compounds with butyrolactone in the present of a catalyst such as Lewis

acids, e.g., aluminum chloride, zinc chloride, iron chloride, stannous chloride, boron tribromide, boron trifluoride and sulfuric acid (Abstract and col. 3, lines 25-30):



Formula (I) of Burzynski et al

wherein R is hydrogen, halo, C1-C4 alkyl, alkenyl, alkynyl, C3-C6 cylcoalkyl, C1-C4 alkoxy, alykenoxy or alkynoxy (col. 1, lines 62-64).

As conceded by the Examiner, Burzynski et al does not employ a solid heteropolyacid catalyst.

Izumi et al discloses a silica-supported Keggin-type heteropolyacid catalyst for Friedel-Crafts alkylation and acylation reactions of aromatic hydrocarbons with 1-octene, benzyl chloride and benzoyl chloride in the liquid phase (Abstract). The Keggin-type heteropolyacids employed were tungstopohosphoric acid, molybdophosphoric and tungstosilicic (page 2159, left column, last paragraph and Examples).

However, Izumi et al does not disclose or suggest the use of its catalyst in a Friedel-Crafts reaction of an aromatic hydrocarbon with an ester, such as a lactone, as described in Burzynski et al. Accordingly, Applicants respectfully submit that there is no suggestion or motivation to use the catalyst of Izumi et al in the reaction of a lactone described in Burzynski et al.

In addition, Izumi et al describes that “In contrast to the case of alkylation with [an] olefin, silica B-supported molybdochosphoric acid catalyzed the alkylation of aromatic hydrocarbons with benzyl chloride most efficiently, … Other active alkyl halides such as bromocyclohexane could be favorably applied as an alkylation agent in the presence of the supported molybdochosphoric acid catalyst, but the catalyst was almost inactive for the alkylation reactions using primary alkyl halides” (page 2160, right column, last paragraph; page 2161, the paragraph bridging left and right columns). Moreover, Izumi et al describes that “Benzoic anhydride was also favorably employed as an acylating agent over the silica-supported tungstosilicic acid, but the acylation with benzoic acid did not proceed over this catalyst” (page 2162, left column, last paragraph).

The above description indicates that the efficiency of the reactions of Izumi et al depends on both the catalyst and the alkylating or acylating agent. As noted above, Izumi et al does not disclose or suggest the use of a lactone as the acylating agent. Accordingly, Applicants respectfully submit that there is no reasonable expectation of success in using the catalyst of Izumi et al in a Friedel-Crafts reaction of a lactone as described in Burzynski et al. It might be, at most, obvious to try. However, “obvious to try” is not a proper standard for a § 103 rejection.

Furthermore, the compound represented by formula (I) of Burzynski et al is not an aromatic ketone, let alone an aromatic cyclic ketone. Accordingly, Applicants respectfully traverse the rejection of claims 13 and 14 on this ground, additionally.

In view of the foregoing reasons, Applicants respectfully submit that the present claims are not obvious over the cited references and thus the rejection should be withdrawn.

IV. Conclusion

In view of the above, reconsideration and allowance of claims 1-9 and 11-15 are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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